

1-1-1985

## Particulate Pollution and the Law of the Sea

John Warren Kindt

Follow this and additional works at: <http://lawdigitalcommons.bc.edu/ealr>



Part of the [Environmental Law Commons](#), and the [Law of the Sea Commons](#)

---

### Recommended Citation

John Warren Kindt, *Particulate Pollution and the Law of the Sea*, 12 B.C. Env'tl. Aff. L. Rev. 273 (1985), <http://lawdigitalcommons.bc.edu/ealr/vol12/iss2/3>

This Article is brought to you for free and open access by the Law Journals at Digital Commons @ Boston College Law School. It has been accepted for inclusion in Boston College Environmental Affairs Law Review by an authorized administrator of Digital Commons @ Boston College Law School. For more information, please contact [nick.szydlowski@bc.edu](mailto:nick.szydlowski@bc.edu).

## PARTICULATE POLLUTION AND THE LAW OF THE SEA

*John Warren Kindt\**

### I. INTRODUCTION

In 1982, the Reagan Administration rejected the conclusions of the Third United Nations Conference on the Law of the Sea (UNCLOS III) and refused to support the work produced at UNCLOS III. This action of the Reagan Administration was prompted primarily by the perceived inequalities of the legal authority governing deep seabed mining. While access to the wealth of the ocean was considered in danger, the environmental aspects of obtaining this ocean wealth were largely forgotten. It is these environmental issues which need to be remembered and are the subject of this analysis.

This article will examine how UNCLOS III responded to the threat of particulate pollution from deep seabed mining. The context in which these environmental considerations arose will first be analyzed by reviewing the different techniques and plans for mining the deep seabed. In this context, the environmental problems involving particulate pollution from deep seabed mining will be discussed.

Thereafter, the major issue of particulate pollution will be examined within the basic parameters of the decision model established by Myres McDougal and Harold Lasswell. The viewpoint will be that of a policy-oriented decision-maker who identifies with the entire international community instead of a particular interest group. As part of this decision-making process, this article will apply the McDougal/Lasswell model, focusing on:

---

\* Professor, University of Illinois at Urbana-Champaign; B.A., 1972, William & Mary; J.D. 1976, M.B.A. 1977, University of Georgia; LL.M. 1978, SJD 1981, University of Virginia. Copyright 1985 by John Warren Kindt.

- a. delimitation of problems;
- b. clarification of goals (the "normative" or "value task");
- c. historical background (the "historical task");
- d. trends and conditioning factors (the "scientific task"); and
- e. policy alternatives and recommendations (the "policy task").<sup>1</sup>

This analysis should reveal some new aspects of the traditional issues involving deep seabed mining. Specifically, it should become obvious that there are potentially serious environmental problems associated with deep seabed exploitation. During UNCLOS III, these problems did not receive the attention which they deserved. Accordingly, the provisions negotiated at UNCLOS III need to be interpreted broadly to provide environmental protection for the common heritage of mankind. The utilization of the McDougal/Lasswell model assists in formulating an interpretation of how economic and environmental considerations can be balanced. It will be realized that the common heritage can be protected from the despoliation of deep seabed exploitation while still allowing the development of ocean wealth.

## II. DEEP SEABED MINING AND THE PROBLEMS OF PARTICULATE POLLUTION

Before utilizing the McDougal/Lasswell model in reaching the conclusion that a balance can be achieved between economic and environmental issues, it is necessary to review particulate pollution in detail. After discussing the source of particulate pollution, this article will review various studies which have outlined how particulate pollution, through deep seabed mining, poses a threat to the ocean environment. The Deep Seabed Hard Mineral Resources Act will then be discussed as one response to this problem.

Deep seabed mining is utilized to exploit many different mineral resources, including manganese nodules, phosphorite nodules, and hot-brine pools, which contain high concentrations of metals such as gold and platinum. The mining of these resources causes a variety of environmental effects, including what is com-

---

<sup>1</sup> McDougal & Schneider, *The Protection of the Environment and World Public Order: Some Recent Developments*, 45 MISS. L.J. 1085, 1087 (1974) [hereinafter cited as McDougal]. For a description and analysis of problems involving manganese nodules, see U.S. DEPT COM., NAT'L OCEANIC & ATMOSPHERIC AD., 1 DEEP SEABED MINING: FINAL PROGRAMMATIC ENVTL. IMPACT STATEMENT xv (1981) [hereinafter cited as SEABED EIS]; Glassner, *The Illusory Treasure of Davy Jones' Locker*, 13 SAN DIEGO L. REV. 533 (1976).

monly known as "particulate pollution." While the term "particulate pollution" is often used to describe generally the environmental effects of deep seabed mining, it can be defined as ocean sediments and other matter which remain suspended in the water column as a result of deep seabed mining or continental shelf dredging.

Of the various resources which are mined from the ocean floor, manganese nodules provide a classic illustration of how mining results in particulate pollution. Appearing as small (1.0 to 20 centimeters), potato-shaped chunks of metal ore that litter many areas of the deep ocean floor, manganese nodules present a technologically and economically feasible source of manganese, copper, nickel and cobalt.<sup>2</sup> While manganese nodules contain some 27 elements in varying proportions, copper and nickel are those with the greatest immediate value.<sup>3</sup> The most economically promising area for their mining is an east-west belt in the east central Pacific Ocean, just south of Hawaii. The size of this area is approximately 13 million square km<sup>4</sup> (3.8 million square mi).<sup>5</sup> As an abundant and valuable resource, manganese nodules could satisfy a significant portion of world demand for not only copper and nickel, but also manganese and cobalt.

Beginning in the early 1970s, both international consortia and individual nations recognized the potential profit of deep seabed mining and commenced environmental studies. The manganese nodules in the central Pacific became the subject of the Deep Ocean Mining Environment Study (DOMES).<sup>6</sup> This preliminary environmental study formed the basis of many of the scientific findings presented in the Final Programmatic Environmental Impact Statement on Deep Seabed Mining (Seabed EIS).<sup>7</sup> The Seabed EIS was completed by the National Oceanic and Atmospheric Administration (NOAA) pursuant to its authority under the Deep Seabed Hard Mineral Resources Act (Seabed Resources

---

<sup>2</sup> See generally NAT'L ACAD. SCI., MINING IN THE OUTER CONTINENTAL SHELF AND IN THE DEEP OCEAN 69-92 (1975); G. MANGONE, MARINE POLICY FOR AMERICA 185-92 (1977).

<sup>3</sup> Glassner, *supra* note 1, at 535.

<sup>4</sup> Nat'l Acad. Sci., *supra* note 2, at 69.

<sup>5</sup> Glassner, *supra* note 1, at 535.

<sup>6</sup> Generally, DOMES is also used to refer collectively to two reports: U.S. DEP'T COM., NAT'L OCEANIC & ATMOSPHERIC AD., PROJECT DEVELOPMENT PLAN: DOMES DEEP OCEAN MINING ENVIRONMENTAL STUDY [hereinafter cited as DOMES DEEP OCEAN MINING ENVIRONMENTAL STUDY (1977) [hereinafter cited as DOMES TECHNICAL PLAN].

<sup>7</sup> SEABED EIS, *supra* note 1, at 6.

Act)<sup>8</sup>—legislation passed by Congress in 1980 to create stability of investment at a time when the international response to deep seabed mining was perceived to be adverse to U.S. interests. By comparison, DOMES was a cooperative NOAA/industry research effort conducted between 1975 and 1981.<sup>9</sup>

While these environmental studies were occurring, industry began investing in deep seabed mining. By the late 1970s, ocean mining technology had advanced to the point where consortia from several developed nations were prepared to proceed with deep seabed mining.<sup>10</sup> In 1981, the deep sea mining industry consisted of six international consortia, four of which included U.S. companies as members. These international consortia engaged in testing engineering systems, exploring potential sites and collecting environmental data. Under licenses from NOAA, the various consortia engaged in exploration and research toward commercial mining, which was authorized by the NOAA to commence after January 1, 1988. NOAA required that mining by U.S. companies could occur only after permits were obtained and after companies complied with applicable laws and regulations.<sup>11</sup>

Years of research yielded various methods of mining manganese nodules on the deep seabed. The three basic techniques developed to recover this resource include: (1) air lift pumping (ALP), which uses compressed air to vacuum nodules off the ocean floor and bring them to the surface through a pipe; (2) hydraulic dredging (HD), which substitutes water pressure for the ALP system of compressed air to lift nodules to the mining ship on the surface; and (3) continuous line bucket (CLB) dredging, which is a simple technique using a continuous cable with several buckets attached to scoop nodules up from the seabed.<sup>12</sup> Of these various techniques, the HD method is favored by the international consortia.<sup>13</sup> After collection, the nodules must be refined, either in land-based or shipboard plants.<sup>14</sup> Chemical leaching and

---

<sup>8</sup> 30 U.S.C. §§ 1401-1473 (Supp. V 1081).

<sup>9</sup> SEABED EIS, *supra* note 1, at xvi.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.* at 7.

<sup>12</sup> Whitney, *Environmental Regulation of United States Deep Seabed Mining*, 19 WM. & MARY L. REV. 77, 79 (1977).

<sup>13</sup> U.S. DEPT. COM., NAT'L OCEANIC & ATMOSPHERIC AD., DEEP SEABED MINING: MARINE ENVTL. RESEARCH PLAN 1981-85 30 (1982) [hereinafter cited as MARINE RESEARCH PLAN].

<sup>14</sup> Whitney, *supra* note 12, at 80-81.

hydrometallurgical techniques appear to be the most commercially feasible methods.<sup>15</sup>

The mining processes developed by the industry have raised serious concern over the environmental impact of deep seabed mining and the subsequent refining of minerals. One major consideration is the degree to which the ocean floor itself will be disturbed. All three recovery systems bring bottom sediments to the surface along with the manganese nodules. This form of particulate pollution may cause hyperproductivity of phytoplankton and retard plant life at lower levels.<sup>16</sup>

Relying on the DOMES mining tests, NOAA concluded that there would be several important environmental impacts caused by deep seabed mining. One impact was the destruction of benthic fauna in and near the collector track caused by the collector itself. While NOAA was unable to conclude that destruction of benthic populations would be significant, there were obvious adverse impacts. NOAA estimates revealed that one percent of the DOMES area would be directly affected by nodule collectors during a twenty year mining period if five operators were engaged in mining. In addition, five percent of the DOMES area containing the richest mineral concentrations would be directly impacted. NOAA cited three factors that were to be studied: (1) the rate of recolonization, (2) the type of species that recolonized the affected area, and (3) the linkage between the food chains found in the water column and on the ocean floor.<sup>17</sup>

In addition to the destruction of benthic populations, NOAA found that disturbance of the ocean floor could result in increased sedimentation and suspended matter in water near the seabed. Commonly referred to as the "rain of fines," this form of pollution would occur as the nodule collector moved along the bottom and created a cloud of fine sedimentary particulates. It is claimed that the rain of fines would probably result in the smothering of immobile creatures and the covering over of the food supply of bottom feeders. Due to these initial predictions, NOAA scheduled further research to examine not only the effects on the flora and fauna, but also particulate settling rates and patterns. Possible means of mitigating these environmental impacts included: (1) improved collector design to minimize the rain of fines, (2) com-

---

<sup>15</sup> *Id.* at 79.

<sup>16</sup> *Id.* at 80.

<sup>17</sup> SEABED EIS, *supra* note 1, at 75, 100-02.

pact mining sites to minimize impact area, and (3) a controlled dispersion of the rain of fines.<sup>18</sup>

A final threat outlined by NOAA involves increased turbidity in the surface discharge area.<sup>19</sup> In the course of reaching the manganese nodules, mining ships would bring up bottom sediment. As this sediment was discharged from the mining ships, the sediment would create a plume in the surface water. The plume would reduce light penetration and thus impair photosynthesis and primary food production.<sup>20</sup> If this sediment settled or dispersed too slowly, large areas of the ocean would be adversely affected.<sup>21</sup> After researching the problem involving the plume, NOAA concluded that during commercial mining the plume from one ship would cause a 50 percent reduction in primary food production in a 10 kilometer by 2 kilometer area. While it was postulated that this plume would disperse in a matter of days and cause little damage,<sup>22</sup> this prediction was only based on a few measurements. Consequently, NOAA concluded that the accuracy of the analysis "must be evaluated in future field or laboratory tests."<sup>23</sup>

A further problem associated with surface discharges involved bacteria attached to the settling sediment. This bacteria could use some or all of the oxygen situated in oxygen-scarce water levels.<sup>24</sup> The plume might also affect important fish species such as tuna. Despite this threat, NOAA concluded that short-term exposure to the plume would not harm the health of fish.<sup>25</sup> The effect of the plume on fish reproduction was not examined by NOAA, but the potential for significant effects was thought to be remote.<sup>26</sup>

NOAA was also concerned that bottom sediment might contain spores, bacteria, antibodies, or other dormant or active organisms. When brought to the surface, one of these environmental "wildcards" could upset the surface ecosystem, endangering flora, fauna, or people.<sup>27</sup> After considering this impact, NOAA concluded

---

<sup>18</sup> *Id.* at 103-06.

<sup>19</sup> MARINE RESEARCH PLAN, *supra* note 13, at 4.

<sup>20</sup> R. FRANK, DEEPSEA MINING AND THE ENVIRONMENT 16 (1976) [hereinafter cited as FRANK].

<sup>21</sup> *Id.* at 15.

<sup>22</sup> SEABED EIS, *supra* note 1, at 95.

<sup>23</sup> *Id.* at 96.

<sup>24</sup> FRANK, *supra* note 20, at 16.

<sup>25</sup> SEABED EIS, *supra* note 1, at 85.

<sup>26</sup> *Id.* at 108-09.

<sup>27</sup> FRANK, *supra* note 20, at 17.

that these possibilities did not warrant serious consideration.<sup>28</sup> A final concern, which remains unresolved, is the impact of pollutive chemicals used in processing the nodules. The refining process, whether land-based or shipboard, will use heavy alkaline and acid-based chemicals. It is feared that the disposal of the chemical wastes resulting from refining will present a difficult problem. Dumping these wastes into the ocean may severely strain the marine ecosystem.<sup>29</sup>

NOAA's findings were only the first step in analyzing the environmental impact of deep seabed mining. After the initial studies, which culminated in the Seabed EIS, NOAA planned environmental monitoring during later mining tests to determine if the mining effects were consistent with those predicted in the Seabed EIS and to detect any other significant environmental effects. Monitoring also constituted the means for determining whether those miners, conducting tests, were complying with the licensing terms, conditions, and restrictions. In addition, the monitoring was designed to assist NOAA in developing proper regulations for commercial mining.<sup>30</sup>

In the Seabed EIS, NOAA stated that because the determinations involving environmental impacts were based on "brief periods of pilot-scale mining," the NOAA Administrator intended to verify or update these determinations by requiring monitoring of demonstration scale mining tests, conducted by the seabed mining industry.<sup>31</sup> Therefore, while NOAA was hopeful that deep seabed mining would have acceptable environmental effects, NOAA was still uncertain about the environmental impacts of full-scale commercial mining.

Pursuant to the Seabed Resources Act,<sup>32</sup> NOAA promulgated, in 1981, regulations regarding exploration licenses for seabed mining.<sup>33</sup> Each license required an environmental impact statement prepared by NOAA.<sup>34</sup> Under the Act, NOAA was required to utilize the best available technologies to mitigate significant effects on safety, health or the environment, unless the benefits

---

<sup>28</sup> SEABED EIS, *supra* note 1, at 84-85.

<sup>29</sup> Whitney, *supra* note 12, at 81.

<sup>30</sup> U.S. DEPT. COM., NAT'L OCEANIC & ATMOSPHERIC AD., DEEP SEABED MINING: FINAL TECHNICAL GUIDANCE DOC. 15 (1981).

<sup>31</sup> SEABED EIS, *supra* note 1, at xix.

<sup>32</sup> 30 U.S.C. §§ 1401-1473 (Supp. V 1981).

<sup>33</sup> 30 U.S.C. § 1468 (1980), 15 C.F.R. Part 970 (1981).

<sup>34</sup> 30 U.S.C. § 1419(d) (1980).



from using the technologies were clearly insufficient to justify their costs.<sup>35</sup>

### III. PARTICULATE POLLUTION AND THE POLITICS OF THE LAW OF THE SEA

Despite what seemed to be a sincere concern for the environment, the central debate over deep seabed mining had a different form: the definition of ownership of seabed resources and the creation of a rational system of regulating their exploitation. After providing a brief overview of the Law of the Sea, this section will review the U.S. response to the results of UNCLOS III, and analyze how environmental concerns, which were developed and documented by NOAA, never received adequate consideration. Following the McDougal/Lasswell model, this section will then discuss the goals of international environmental law, the history behind disagreement over the Law of the Sea, and policy alternatives and recommendations.

#### A. *The LOS Convention*

Throughout the 1970s and 1980s, disagreement over ownership of the seabed hovered somewhere between the extremes of *res nullius* (the property of nobody) and *res communes* (things common to all).<sup>36</sup> Prior to UNCLOS III, it appeared that private mining of the deep seabed was authorized under international customary and treaty law, but that exclusive mining claims probably were not.<sup>37</sup> The ultimate product of UNCLOS III was the Convention on the Law of the Sea (LOS Convention).<sup>38</sup> The LOS Convention and its forerunners, the "negotiating texts," reflected the deep seabed theories of the Third World countries.<sup>39</sup> The Third World countries, who dominated the deep seabed negotiations during UNCLOS III, theorized that deep sea exploitation outside the confines of the 1982 LOS Convention provisions was illegal.

---

<sup>35</sup> *Id.* at § 1419(b).

<sup>36</sup> Burton, *Freedom of the Seas: International Law Applicable to Deep Seabed Mining Claims*, 29 STAN. L. REV. 1135, 1159 (1977). *Res communis* is frequently misspelled *res communes*.

<sup>37</sup> *See id.* at 1180-81.

<sup>38</sup> Done, Dec. 10, 1982, reprinted in 21 I.L.M. 1261, U.N. Doc. A/CONF.62/122 (1982) [hereinafter cited as LOS Convention].

<sup>39</sup> For an analysis of customary international law vis-a-vis the LOS Convention, see Howard, *The Third United Nations Conference on the Law of the Sea and the Treaty/Custom Dichotomy*, 16 TEX. INT'L L.J. 321 (1981).

Since the provisions of the LOS Convention reflected and codified, in part, the international customary law as of 1982, the debate over deep seabed mining intensified.

Naturally, the uncertain status of deep sea resources throughout the UNCLOS III negotiations made the mining consortia, particularly U.S. members, hesitant to proceed with deep seabed mining,<sup>40</sup> and prompted the Seabed Resources Act of 1981. To understand how the policy conflicts between the United States and other participating members at the LOS Convention were created, and why such conflicts prevented environmental problems from being addressed, the U.S. position involving deep seabed mining must be reviewed from its beginning. This section will demonstrate how particulate pollution issues must be viewed within the penumbra of serious and strategic policy differences.

During the late 1960s, the United States fostered its interest in deep seabed mining for a variety of reasons. Steel, which is essential to any highly industrialized country, could not be manufactured without manganese, and approximately 98 percent of the U.S. manganese requirement continued to be imported.<sup>41</sup> Cobalt and nickel, also necessary to the U.S. economy, were imported during 1978 at rates of 98 and 71 percent, respectively.<sup>42</sup> Other estimates indicated that the United States imported 100 percent of its cobalt and 95.9 percent of its nickel.<sup>43</sup> The primary metals found in manganese nodules were crucial to industrial protection, particularly the electrical and steel industries; these metals were also essential for products requiring high temperature alloys.<sup>44</sup>

In the mid-1970s, it became evident that "actions by the mineral exporting nations evidence[d] a determination to cartelize and to follow the successful example of the Organization of Petroleum Exporting Countries (OPEC)."<sup>45</sup> The prospect of a cartelization of the mineral exporters resurrected specters of the 1973 OPEC oil embargo<sup>46</sup> and served as an example of the vulnerability of the

---

<sup>40</sup> See Whitney, *supra* note 12, at 89.

<sup>41</sup> SEABED EIS, *supra* note 1, at 6.

<sup>42</sup> Slappey, *Who Will Reap the Mineral Riches of the Deep?*, NATIONS BUS., Mar. 1978, at 25, 32.

<sup>43</sup> SEABED EIS, *supra* note 1, at 6.

<sup>44</sup> *Id.*

<sup>45</sup> Pietrowski, *Hard Minerals On The Deep Floor: Implications For American Law And Policy*, 19 WM. & MARY L. REV. 43, 44 (1977). *Contra* Note, *Unilateral Deep Seabed Mining and Environmental Standards: A Risky Venture*, 8 BROOKLYN J. INT'L L. 345, 349-50 (1981) [hereinafter cited as *Risky Venture*].

<sup>46</sup> Pietrowski, *supra* note 45, at 44.

United States to resource exporters and as an example of the concomitant dangers to national security.<sup>47</sup> Moreover, imports of manganese, copper, nickel, and cobalt continued to contribute to the U.S. trade deficit. It was estimated that the mining of manganese nodules could make the United States self-sufficient in these minerals by the year 2000.<sup>48</sup> The contribution of deep seabed mining to a positive balance of trade for the United States could not be ignored.

The interests of the U.S. seabed mining industry in the rapid development of deep seabed mining paralleled those of the policy-makers in respective U.S. administrations from Presidents Nixon to Reagan. Through heavy research and development expenditures, U.S. companies developed advanced technologies for deep seabed mining.<sup>49</sup> Even so, the delays in proceeding with deep seabed mining made it increasingly difficult for U.S. companies to recover their research and development investments. Competition for mining sites also became more intense as an increasing number of foreign companies became involved in deep seabed mining. Accordingly, U.S. companies developed a strong interest in the rapid implementation of deep seabed mining.<sup>50</sup>

With these strong interests in mind, U.S. negotiators approached the Law of the Sea deliberations with a deep commitment to protecting their own investments. During 1982, six objections were made to the LOS Convention.<sup>51</sup> First, the United States believed that the LOS Convention and prior negotiating texts deterred the development of deep seabed resources, which were necessary to meet both U.S. and international demand.<sup>52</sup> Those policies enumerated in the LOS Convention which tended to curb the development of seabed resources included:

- a. the policies of the International Seabed Authority (ISA) which were designed to regulate seabed mining and which gave priority to concerns other than those encouraging efficient and economic resource development;

---

<sup>47</sup> See Kindt, *Investment Interdependence as a Potential Response by the United States to Future Arab Oil Embargoes*, 7 AUSTRAL. Y.B. INT'L L. 279, 280-82 (1981).

<sup>48</sup> Pietrowski, *supra* note 45, at 45-46. *But see Risky Venture*, *supra* note 45, at 348-50.

<sup>49</sup> Whitney, *supra* note 12, at 77.

<sup>50</sup> *But see Risky Venture*, *supra* note 45, at 348-50.

<sup>51</sup> Bureau Pub. Aff., U.S. Dep't St., Law of the Sea: Current Pol'y No. 371, 2-3 (Jan.-Feb. 1982) [hereinafter cited as LOS 1982 Press Release]; U.S. Dep't St., Report of the United States Delegation to the Eleventh Session Of The United Nations Conference On The Law Of The Sea, March 8-April 30, 1982, 1 (June 1982) [hereinafter cited as U.S. Eleventh Session Report].

<sup>52</sup> LOS 1982 Press Release, *supra* note 51, at 2.

- b. the production ceiling which set limits on the quantity of minerals which could be mined;
- c. the limit placed on the number of mining operations that any one country could conduct, thus potentially restricting the ability of the United States to supply the consumption demands from the seabed; and
- d. the discretionary nature of the administrative and regulatory policy areas which discouraged deep seabed mineral development if implemented in accordance with the production policies of ISA.<sup>53</sup>

Secondly, the policies set forth in the LOS Convention did not guarantee qualified applicants national access to deep seabed minerals; rather, the Enterprise, the operating arm of the ISA, was given the opportunity to establish a monopoly over the resources. Moreover, the policies did not encourage economic development of mineral resources.<sup>54</sup>

The LOS Convention provided no assurance that any qualified private applicants sponsored by the United States would be awarded deep seabed mining contracts.<sup>55</sup> The United States believed that a contract should be granted to any qualified applicant, and that absent a vote by objective technical experts who found that the applicant's qualifications were improperly or falsely certified, the ISA should accept the certification provided by the sponsoring country.<sup>56</sup>

The United States also desired provisions (termed "grandfather clauses") for protecting the legal and commercial rights of those pioneer investors who had already made substantial investments in deep seabed mining.<sup>57</sup> It was argued that "[d]eep seabed mineral resources . . . [would] not be made available without the continuing efforts of pioneer miners."<sup>58</sup>

Similarly, the United States opposed the system of privileges created by the LOS Convention, which discriminated against the private side of the parallel system for mining the seabed.<sup>59</sup> Under the LOS Convention, private companies were basically manipulated into entering joint ventures with either developing countries or with the Enterprise, thus enabling the Enterprise to

---

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> *Id.* at 3.

establish monopolistic control over deep seabed mineral resources.<sup>60</sup>

The third objection of the United States to the LOS Convention was particularly important to policy-oriented decision-makers. The LOS Convention did not provide a decision-making role concerning the deep seabed regime which fairly reflected and effectively protected the economic, political, and financial interests of the United States.<sup>61</sup> The United States had the potential for being the largest financial contributor to the Enterprise as well as the largest consumer of deep seabed minerals.<sup>62</sup> It was essential, therefore, for the United States to have affirmative influence in the decision-making process sufficient to protect U.S. interests.<sup>63</sup>

The U.S. strongly objected to the procedure followed when adopting amendments to the LOS Convention. Two-thirds of the member States acting at the scheduled review conference could adopt amendments which would be binding on all States parties, regardless of their concurrence.<sup>64</sup> If the United States or any other country were to object to an amendment, that country would only have the option of withdrawing from the LOS Convention. Not surprisingly, this procedure was unacceptable to those countries who would necessarily have major economic interests, as well as substantial capital investments, at risk.<sup>65</sup> The United States could not allow itself to be bound automatically by amendments without the option of maintaining its own approval procedure as a participating State; specifically, the advice and consent of the U.S. Senate.<sup>66</sup>

As a further objection, the United States asserted that the LOS Convention had set undesirable international precedents.<sup>67</sup> These objectionable precedents included, *inter alia*, artificial production limits and the mandatory transfer of seabed mining technology from the developed countries to the underdeveloped countries.

The sixth and final objection by the United States involved the overall realization that these objectionable policies, as enumerated in the LOS Convention, would probably not receive the

---

<sup>60</sup> *Id.*

<sup>61</sup> *Id.*

<sup>62</sup> *Id.*

<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

consent of the U.S. Senate.<sup>68</sup> Provisions such as the mandatory transfer of private technology and the participation by and funding of national liberation movements, such as the Palestine Liberation Organization, would not be acceptable to the Senate. These provisions would impose commercial and economic hardships upon those private companies required to transfer their advanced technology through a forced sale.<sup>69</sup>

In an attempt to outline U.S. objections to some of the provisions in the LOS Convention, the United States promulgated a series of amendments to the UNCLOS III negotiators on March 11, 1982.<sup>70</sup> This package of amendments, popularly known as the "Green Book," was a formalization of an "alternative approaches paper" which the United States had circulated during the intersessional meeting, held from February 24 to March 2, 1982.<sup>71</sup> The paper presented at the intersessional meeting outlined the major U.S. concerns regarding the deep seabed mining provisions, and proposed several solutions to the U.S. concerns.<sup>72</sup> The Green Book was an attempt to put the U.S. proposals in the form of specific textual language, as required by the Group of 77, a powerful bloc of over 100 developing countries.<sup>73</sup> When disseminating the Green Book, the U.S. delegation asserted that the proposed amendments constituted only one of a number of possible solutions and that no ultimatum was intended.<sup>74</sup> Specifically, the U.S. delegation emphasized that the only purpose of the Green Book was to provide specific textual language as requested by the Group of 77.<sup>75</sup> However, the Green Book made it apparent to the other delegations that the six objections of the United States could not be satisfied without substantive changes being made in the negotiating text for the LOS Convention, which had been finalized by the other countries participating in UNCLOS III. Accordingly, the Green Book prompted a significant adverse reaction from many countries at UNCLOS III.<sup>76</sup>

In this context, three heuristic models evolved which reflect the views and opinions of varying groups concerning the position that

---

<sup>68</sup> *Id.*

<sup>69</sup> *Id.* at 4.

<sup>70</sup> U.S. Eleventh Session Report, *supra* note 51, at 2.

<sup>71</sup> *Id.* at 1-2.

<sup>72</sup> *Id.* at 2.

<sup>73</sup> *Id.*

<sup>74</sup> *Id.*

<sup>75</sup> *Id.*

<sup>76</sup> *Id.* at 2-3.

the United States should have taken with regard to the policies promulgated by UNCLOS III.<sup>77</sup> The first model was termed the "Richardson view." Essentially, this model rested on a strong realization that the LOS Convention was "important to the overall interests of the United States ... that at stake here [was] a matter of institution-building, a matter of strengthening the United Nations system and global law-making machinery."<sup>78</sup> The most important issues to be considered were those involving navigational freedoms and other important security objectives.<sup>79</sup> An implicit part of this view was the determination that the LOS Convention represented the best text which could be negotiated.<sup>80</sup> Finally, it was believed that this view could receive the requisite support and backing of the U.S. Senate.<sup>81</sup> After 1977, adherents of this model urged the United States to move forward with the treaty text as negotiated, while still trying to single out and modify a few remaining problems (such as providing "preparatory investment protection" (PIP) for the research investments made by the seabed mining industry) prior to submitting the final LOS Convention to the Senate.<sup>82</sup> It was an optimistic view of progress.

The second model, the "skeptical view," was not as cohesive as the Richardson view, primarily because it represented a number of diverse viewpoints that moved together in significant opposition to the Richardson view.<sup>83</sup> One segment supporting the skeptical view argued that the LOS Convention was unnecessary to the United States. Proponents of this view argued that any LOS Convention would necessarily involve relinquishing the access rights of the United States to deep seabed minerals.<sup>84</sup> The skeptical view also tended to stress the importance of the access issue since U.S. economic needs dictated that the United States have access to the cobalt, copper, manganese and nickel on the deep seabed. By comparison, the Richardson view tended to stress the navigational issues and did not argue the issue of the relative importance of U.S. access to seabed minerals.<sup>85</sup> Another compo-

---

<sup>77</sup> Moore, *Charting a New Course in the Law of the Sea Negotiations*, 10 DEN. J. INT'L L. & POL'Y 207, 210-16 (1981).

<sup>78</sup> *Id.* at 211.

<sup>79</sup> *Id.*

<sup>80</sup> *Id.*

<sup>81</sup> *Id.*

<sup>82</sup> *Id.*

<sup>83</sup> *Id.* at 211-12.

<sup>84</sup> *Id.* at 212.

<sup>85</sup> *Id.*

nent of the skeptical view was that the policies set forth by the LOS Convention would, in all likelihood, not be endorsed by the U.S. Senate.<sup>86</sup> There were "simply too many kinds of problems, too many different diverse groups, and . . . a more broadly based consensus including the seabed mining industry [was necessary] to move this treaty forward."<sup>87</sup>

It can be argued that the third model, the "balanced view," included the best and most practical elements of both the Richardson view and the skeptical view.<sup>88</sup> Proponents of this view believed that acceptance of the LOS Convention was important to the national interest of the United States and that the "institution-building" elements of the LOS Convention were significant.<sup>89</sup> The United States was successful in negotiating the essential provisions protecting navigational freedoms and U.S. national security.<sup>90</sup> Alternatively, this view proposed a firm position with regard to the U.S. national interest in guaranteed access to deep seabed minerals.<sup>91</sup> However, the regime that had been negotiated at UNCLOS III on assured access, a significant economic issue, was subject to differing interpretations.<sup>92</sup> Beyond these basic Law of the Sea issues, the following areas were found to have major institutional defects concerning the deep seabed mining provisions:<sup>93</sup>

- a. the test was ambiguous as to whether or not terrorist groups such as the Palestine Liberation Organization would be allowed a percentage of the revenues acquired from deep seabed mining;<sup>94</sup>
- b. the Eastern European "Socialist Bloc" and the USSR were given three permanent seats on the Council of the ISA;<sup>95</sup> however, the United States would have, at best, only one seat which could periodically be rotated off if U.S. allies ever decided that some other NATO member had the right to participate on the Council;<sup>96</sup>
- c. the review provision clause called for a review conference

---

<sup>86</sup> *Id.* at 213.

<sup>87</sup> *Id.*

<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Id.*

<sup>91</sup> *Id.*

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> *Id.*

<sup>95</sup> *Id.* at 214.

<sup>96</sup> *Id.*



- to be held to reexamine the deep seabed mining issue after 15 years<sup>97</sup>—at which time it would be decided whether changes would be implemented concerning the provisions and if an agreement could not be reached within 5 years, a conference vote could be taken and the entire issue of deep seabed mining could be rewritten by a single two-thirds vote, and the new provisions would be binding on every nation that was a signatory, whether or not that country voted for it,<sup>98</sup> and
- d. the mandatory transfer of technology provision was viewed as being an absolute treaty-stopper,<sup>99</sup> since this provision amounted to a forced sale of the technological lead of the U.S. seabed mining industry.<sup>100</sup>

While the balanced view was arguably the best approach, the Reagan Administration accepted the skeptical view. As a result, the United States forced a vote on the LOS Convention on April 30, 1982, during the eleventh and final negotiating session of UNCLOS III.<sup>101</sup> The Conference adopted the LOS Convention by a vote of 130 in favor and 4 against (Israel, Turkey, the United States, and Venezuela).<sup>102</sup> There were also 17 abstentions, including: Belgium, the Federal Republic of Germany, Italy, Luxembourg, Mongolia, the Netherlands, Spain, Thailand, the United Kingdom, and the East European Bloc, except Romania.<sup>103</sup>

A forced vote by the United States seemed to alienate the international community from the U.S. positions not only on Law of the Sea issues, but also on other issues as well. Like many of its major allies, the United States could have abstained, thereby registering dissatisfaction with the LOS Convention while still maintaining some international posture. By force a vote and then voting against the LOS Convention, the United States was perceived as attacking a ten year diplomatic effort by the entire international community, rather than registering its concerns over what it viewed as unreasonable economic concessions.

---

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.* at 215.

<sup>100</sup> *Id.*

<sup>101</sup> U.S. Eleventh Session Report, *supra* note 51, at 1.

<sup>102</sup> *Id.*

<sup>103</sup> *Id.* For an analysis of the policies of the Reagan Administration regarding UNCLOS III, see Larson, *The Reagan Administration and the Law of the Sea*, 11 OCEAN DEV. & INT'L L.J. 297 (1982).

*B. Goals*

The three overall goals involving the international environment have been delimited as: 1) protecting common interests and rejecting special interests; 2) minimizing damage to the environment (the "negative goal"); and 3) utilizing the positive motivation of optimum order (including preserving the environment and securing its most constructive use for present and future generations).<sup>104</sup> At first, it appeared that the goals of U.S. foreign policy regarding deep seabed mining constituted special interests and should have been rejected. However, when the U.S. goals were examined more closely, it became apparent that these goals were shared, with a few exceptions, by several of the industrialized countries at UNCLOS III, including the Federal Republic of Germany and the United Kingdom. The history of the UNCLOS III negotiations discloses that the U.S. goals were not "special interests" but representative "common interests." It was within this context that Secretary of State Kissinger proposed, as a compromise, the parallel system which eventually became the basis for the deep seabed regime in the LOS Convention.

By reviewing the history of the Committee I negotiations at UNCLOS III, including the drafting of the deep seabed mining regime, it becomes apparent that the common interest of mankind involved developing the deep seabed minerals within a system which balanced the concerns of both the industrialized countries and the Group of 77. Unfortunately, the arguments asserted by the Group of 77 became so one-sided that, in the deep seabed provisions, the balance of concerns was lost and the common interest provisions were transformed largely into special interest provisions.

Amid the rancor which accompanied the Committee I negotiations, there was little consideration of the two other overall goals: minimizing damage to the marine environment, and preserving the marine environment and securing its most constructive use for present and future generations. While the United States had attempted to gauge the environmental effects from the particulate pollution of deep seabed mining,<sup>105</sup> the negative goal of minimizing damage to the marine environment was largely ignored by Committee I. The negotiators were preoccupied with arguing over developmental concerns and the distribution of

---

<sup>104</sup> McDougal, *supra* note 1, at 1089-91.

<sup>105</sup> See text and note at notes 4-9, 16-35.

ocean resources. A myopic fixation on "ocean wealth" resulted in provisions governing the minutia of developmental considerations. By comparison, only a few relatively broad provisions governing environmental considerations were incorporated into the seabed mining provisions of the LOS Convention.

The Committee I negotiators' concern over economic considerations overshadowed the important subgoals of minimizing marine damage. The seabed mining provisions designed by Committee I did not promote the subgoals of restoration, rehabilitation, or reconstruction. The negotiators were preoccupied by developmental concerns; consequently, long-term environmental considerations were largely ignored. While the large-scale mining of the ocean was arguably far in the future, provisions for environmental concerns should have been more detailed.

The concepts of prevention and deterrence were also generally ignored. Since deep seabed mining had not begun during UNCLOS III and since prevention and deterrence were immediate subgoals, proper consideration of these two subgoals could have obviated the necessity to emphasize the other three subgoals. However, Committee I placed too little emphasis on prevention and deterrence. As a result, the failure to achieve provisions which would adequately incorporate these subgoals will create future problems involving particulate pollution from deep seabed mining.

Professor John Norton Moore has analyzed these overall goals and subgoals in the context of ocean policy. He provides the following goals: 1) security; 2) management (avoidance, reduction, and settlement) of conflict; 3) promotion of efficiency and fair access in ocean use; 4) protection of the environment; and 5) promotion of ocean knowledge.<sup>106</sup> A sixth overall goal, according to Moore, is the "maintenance of a favorable legal order."<sup>107</sup> In the context of particulate pollution, the most relevant consideration in the overall goal of "protecting the environment" consists of the "effective prevention of oceans pollution through identification of threats, understanding of the fate and effects of pollutants, systematic monitoring, and institutionalization of measures to end serious threats."<sup>108</sup> While the DOMES project of the United States has promoted the identification of the threat of particulate pollu-

---

<sup>106</sup> Moore, *A Foreign Policy For The Oceans*, in *THE OCEANS AND U.S. FOREIGN POLICY* 2 (Center for Oceans Law & Pol'y, Apr. 1978).

<sup>107</sup> *Id.*

<sup>108</sup> *Id.* at 3.

tion, the LOS Convention provides little assistance in collating fate and effects studies, establishing systematic monitoring of future particulate pollution, or institutionalizing measures to cope with serious pollution threats such as particulate pollution from deep seabed mining.

Pollution resulting from the disruption of the seabed and the refining of manganese nodules has not received adequate attention, despite the fact that the impact of deep seabed mining could be devastating to marine ecosystems. In light of this threat, any system of regulation must set environmental protection as a goal of first priority.<sup>109</sup> A system of regulation must be designed to incorporate all environmental goals to promote the maintenance of a favorable legal order and to avoid future political conflicts resulting from deep seabed mining.

### *C. Historical Background*

The third task of the McDougal/Lasswell format is the "historical task," which provides perspective by reviewing precedent with regard to the evolving Law of the Sea. The context in which the LOS Convention provisions were formulated adds to an understanding of the positions asserted by the respective sides in the debate involving deep seabed mining. An overview of the significant events in the evolution of the modern Law of the Sea reveals that countries formulated their positions and reduced their negotiating flexibility over a period of years.

This process began with the early U.N. negotiations on the Law of the Sea. The First U.N. Conference on the Law of the Sea (UNCLOS I) was convened in 1958. Deep seabed mining was implicitly governed by the 1958 Convention on the High Seas (High Seas Convention),<sup>110</sup> which was one of four conventions produced by UNCLOS I. Article 2 of the High Seas Convention implied that deep seabed mining was legal as long as "reasonable regard to the interests of other States" was given, and sovereignty was not claimed.<sup>111</sup> The High Seas Convention did not deal explicitly with deep seabed mining because it had "not yet

---

<sup>109</sup> See Whitney, *supra* note 12, at 78, 80-81.

<sup>110</sup> *Done*, Apr. 29, 1958, [1962] 2 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82 (entered into force Sept. 30, 1962) [hereinafter cited as High Seas Convention]; see Pietrowski, *supra* note 45, at 52-53.

<sup>111</sup> High Seas Convention, *supra* note 110, art. 2; Pietrowski, *supra* note 44, at 53.

assumed sufficient practical importance to justify special regulation."<sup>112</sup>

The Second U.N. Conference on the Law of the Sea (UNCLOS II) was convened in Geneva in 1960 primarily to consider the issue of the territorial sea. The 88 delegates who attended failed to reach agreement, and UNCLOS II had little impact on the issue of deep seabed mining.

Deep seabed mining was again addressed in the now-famous speech by the Maltese Ambassador to the U.N., Arvid Pardo.<sup>113</sup> Ambassador Pardo declared that the mineral wealth of the deep seabed should be considered as the "common heritage of mankind."<sup>114</sup> In response to Pardo's speech, the United Nations General Assembly established the Ad Hoc Committee to Study the Peaceful Uses of the Deep Seabed (the Ad Hoc Seabed Committee).<sup>115</sup>

The 35 member States of the Ad Hoc Seabed Committee met in 1968 to develop a practical means to promote international cooperation in the exploration, conservation, and utilization of the seabed. At its next session, the General Assembly created the standing Committee on the Peaceful Uses of the Sea-Bed and the Ocean Floor Beyond the Limits of National Jurisdiction (the Seabed Committee) to replace the Ad Hoc Seabed Committee.<sup>116</sup>

In 1970, the General Assembly adopted the draft *Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction*,<sup>117</sup> prepared by the Seabed Committee. The Declaration contained the following guidelines:

- 1) The seabed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction . . . [the Area], as well as the resources of the area, are the common heritage of mankind.
- 2) The area shall not be subject to appropriation by any means by States or persons, natural or juridical, and no

---

<sup>112</sup> Report of the International Law Commission to the General Assembly, 11 U.N. GAOR Supp. (No. 9) at 24.

<sup>113</sup> U.N. Doc. A/AC.135/1, at 27 (1967).

<sup>114</sup> See Note, *The History of Negotiations Concerning the System of Exploitation of the International Seabed*, 9 N.Y.U. J. INT'L L. & POL. 483, 485 (1977) [hereinafter cited as *History*].

<sup>115</sup> See Pietrowski, *supra* note 45, at 55; *History*, *supra* note 114, at 485-89.

<sup>116</sup> Pietrowski, *supra* note 45, at 55.

<sup>117</sup> G.A. Res. 2749, 5 U.N. GAOR Supp. (No. 28) at 24, U.N. Doc. A/8028 (1970) (108 for, 0 against, 14 abstentions).

- State shall claim or exercise sovereignty or sovereign rights over any part thereof.
- 3) No State or person, natural or juridical, shall claim, exercise or acquire rights with respect to the area or its resources incompatible with the international regime to be established and the principles of this Declaration.
  - 4) All activities regarding the exploration and exploitation of the resources of the area and other related activities shall be governed by the international regime to be established.<sup>118</sup>

Following the Declaration of Principles, the General Assembly called for the convening of UNCLOS III.

The first substantive session of UNCLOS III convened in Caracas in June, 1974. Three committees were established, and Committee I was assigned the responsibility of negotiating a compromise to the deep seabed problem.<sup>119</sup> Negotiating flexibility began to diminish significantly with the issuance of the Informal Composite Negotiating Text/Revision 2 (ICNT/Rev. 2)<sup>120</sup> which was released in 1980. It was intended that each of the negotiating texts would not "articulate a consensus on the subjects covered; ... [but] serve only as a basis for further negotiations."<sup>121</sup> However, the failure of the industrialized countries to negotiate changes in the ICNT/Rev.2 brought those countries to the realization that the deep seabed provisions embodied in the ICNT/Rev.2 were unlikely to change significantly in future negotiating texts. The Draft Convention on the Law of the Sea (Informal Text) [DC(IT)],<sup>122</sup> which was also released in 1980, further supported this conclusion.

In 1981, the Draft Convention on the Law of the Sea (Draft LOS Convention)<sup>123</sup> further reinforced the deep seabed provisions. That same year, the Reagan Administration initiated a policy review which was transformed into a last attempt to amend the negotiat-

---

<sup>118</sup> *Id.*

<sup>119</sup> See Pietrowski, *supra* note 45, at 57-59. For a discussion of the UNCLOS III, 1974 Caracas Session, see Stevenson & Oxman, *The Third United Nations Conference on the Law of the Sea: The 1974 Caracas Session*, 69 AM. J. INT'L L. 1 (1975).

<sup>120</sup> U.N. Doc. A/CONF.62/WP.10/Rev.2 (1980) [hereinafter cited as ICNT/Rev.2]. For a discussion of the UNCLOS III Session at which the ICNT/Rev.2 was issued, see Oxman, *The Third United Nations Conference on the Law of the Sea: The Ninth Session (1980)*, 75 AM. J. INT'L L. 211 (1981).

<sup>121</sup> Pietrowski, *supra* note 45, at 59; see *Sea Law Conference To Meet Again Next March; Substantial Progress Said Made Since Caracas*, U.N. CHRON., Oct. 1978, at 41 [hereinafter cited as *Sea Law*].

<sup>122</sup> U.N. Doc. A/CONF.62/WP.10/Rev.3 9 (1980) [hereinafter cited as DC(IT)].

<sup>123</sup> U.N. Doc. A/CONF.62/L.78 (1981) [hereinafter cited as Draft LOS Convention].

ing text (pursuant to the "Green Book"). The attempt to modify the Draft Convention failed and the final negotiating text became the LOS Convention when it was adopted by UNCLOS III during the vote which was forced by the United States.<sup>124</sup> On July 9, 1982, President Reagan, citing the onerous provisions on deep seabed mining, stated that the United States would not become a party to the LOS Convention.<sup>125</sup>

#### *D. Trends and Conditioning Factors*

The ICNT/Rev.2 ostensibly was the negotiating text which represented the turning point in the negotiations in Committee I. When the unofficial Evensen Text, written before the ICNT/Rev.2 was submitted to the committee chairman, Paul Engo, it was revised without consulting either the Committee or even a representative subgroup.<sup>126</sup> The result was the Informal Composite Negotiating Text (ICNT).<sup>127</sup> The United States and other developed countries maintained that the ICNT was a "drastic departure from the compromises reached in the Working Group unduly favoring the position of the radicals in the Group of 77."<sup>128</sup> The controversial text provisions were retained in the Informal Composite Negotiating Text/Revision 1 (ICNT/Rev.1),<sup>129</sup> as well as in the ICNT/Rev.2, the DC(IT), the Draft LOS Convention, and the final LOS Convention. The United States made it clear that the ICNT concepts on deep seabed mining provided an unacceptable system of regulation.

The U.S. position was backed by several other industrialized countries. Since many leading and industrialized countries did

---

<sup>124</sup> See LOS Convention, *supra* note 38. See also K. SIMMONDS, U.N. CONVENTION ON THE LAW OF THE SEA 1982 vii (1983).

<sup>125</sup> SIMMONDS, *supra* note 124, at xvi-xvii.

<sup>126</sup> Charney, *United States Interests in a Convention on the Law Of the Sea: The Case For Continued Efforts*, 11 VAND. J. TRANSNAT'L L. 39, 57 (1978).

<sup>127</sup> U.N. Doc.A/CONF.62/WP.10, 8 OFFICIAL RECORDS OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA 1 (1977) [hereinafter cited as ICNT]. For a discussion of the ICNT, see Oxman, *The Third United Nations Conference on the Law of the Sea: The 1977 New York Session*, 72 AM. J. INT'L L. 57 (1978).

<sup>128</sup> Charney, *supra* note 126, at 57; see ICNT, *supra* note 127, arts. 133-91; Oxman, *The Law of the Sea Conference and Development: Food and Energy Resources*, 13 LAW. AM. 157 (1981). The deep seabed mining negotiations produced sharp divisions between the industrialized and the developing countries despite the fact that deep seabed mining will have little impact on the development of the developing countries before the end of the twentieth century.

<sup>129</sup> U.N. Doc.A/CONF.62/WP.10/Rev.1 (1979) [hereinafter cited as ICNT/Rev.1].

not accept the LOS Convention, there is a considerable and persuasive argument that the deep seabed provisions will not constitute international law, even if the LOS Convention receives enough accessions to enter into force. It is argued, however, that navigational and other provisions of the LOS Convention are representative of international customary law and are therefore enforceable principles. These arguments aside, it is important to review and understand the environmental provisions involving deep seabed mining as they evolved in the respective negotiating texts.

Examination of the various negotiating texts and the final text reveals that after the ICNT (and particularly the ICNT/Rev.2), certain concepts remained relatively unchanged from session to session.<sup>130</sup> There seemed to be agreement that an International Sea-Bed Authority (ISA or "the Authority") would be established to control all deep seabed mining. The ISA was to consist of an Assembly, a Council (and concomitant commissions), a Secretariat, and an Enterprise.<sup>131</sup> The texts called for a form of exploitation that would be conducted under Secretary Kissinger's "parallel system," involving both public and private developers.<sup>132</sup> Rules and regulations to protect the ecosystem from harmful effects of development would be formulated by a Legal and Technical Commission.<sup>133</sup> While the United States did not agree with certain deep seabed mining provisions, these provisions and the environmental provisions in general were not objectionable.

The Assembly was given the authority to establish general policies beyond those specified in the LOS Convention itself. The Council was designed to work with the Legal and Technical Commission to develop specific policies dealing with exploration

---

<sup>130</sup> See Charney, *supra* note 126, at 58.

<sup>131</sup> Revised Single Negotiating Text, U.N. Doc.A/CONF.62/WP.8/Rev.1/Parts I, II, III, 5 OFFICIAL RECORDS OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA 125 (1976) [hereinafter cited as RSNT]; U.N. Doc.A/CONF.62/WP.9/Rev.2/Part IV, 6 OFFICIAL RECORDS OF THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA 144 (1977); see ICNT, *supra* note 127, arts. 154-86; ICNT/Rev. 2 *supra* note 120, arts. 156-85; DC(IT), *supra* note 122, arts. 156-85; Draft LOS Convention, *supra* note 123, arts. 156-85; LOS Convention, *supra* note 38, arts. 156-85.

<sup>132</sup> See RSNT, *supra* note 131, art. 22(1), Annex I; ICNT, *supra* note 127, art. 151(2)(ii), Annex II; ICNT/Rev.2, *supra* note 120, art. 153(2)(b), Annex III, DC(IT), *supra* note 122, art. 153(2)(b), Annex III, Draft LOS Convention, *supra* note 123, art. 153(2)(b), Annex III, LOS Convention, *supra* note 38, art. 153(2)(b), Annex III.

<sup>133</sup> RSNT, *supra* note 131, art. 31; ICNT, *supra* note 127, art. 163; ICNT/Rev.2, *supra* note 120, art. 165; DC(IT), *supra* note 122, art. 165, Draft LOS Convention, *supra* note 123, art. 165, LOS Convention, *supra* note 38, art. 165.



and exploitation activities and with the necessary protection and preservation of the marine environment. While there are several provisions involving the Legal and Technical Commission which charge that Commission with enforcing the environmental goals mentioned earlier, these provisions could have been stronger.<sup>134</sup> The clear emphasis of the seabed mining provisions of the LOS Convention is on development and not on a balance between development and environmental protection. More importantly, the industrialized countries were not allowed to have the representation which was commensurate with their worldwide influence and with their capital investments in deep seabed mining. Since the developing countries have historically demonstrated a reckless disregard for the environment,<sup>135</sup> the ISA, which is overly-dominated by the developing countries, can be expected to perpetuate a *de facto* disrespect for the marine environment regardless of the *de jure* concern expressed in the LOS Convention.

The Enterprise was the entity designed to mine the seabed on behalf of the ISA. Proceeds from mining and licensing were to be distributed throughout the world community on an equitable basis. The distribution would take "into particular consideration the interest and needs of developing States and of peoples who have not attained full independence of other self-governing status."<sup>136</sup>

Areas of concern that still required substantial negotiation after the ICNT included: (1) the political governance of the ISA, the Council's jurisdiction, composition, and method of voting; (2) the method of exploitation; and (3) the resource policy of the ISA.<sup>137</sup> During UNCLOS III, the U.S. negotiators believed that the ICNT political structure (retained in the ICNT/Rev.2) gave too much power to the Group of 77. As one commentator described the ICNT, "To the extent that the Assembly could dictate to the Council, the political control would rest in the one-nation, one-vote Assembly which would be dominated by the Group of 77."<sup>138</sup> If the

---

<sup>134</sup> See LOS Convention, *supra* note 38, art. 165, paras. 2(d)-(f), 2(h), and 2(k)-(m).

<sup>135</sup> See Note, *Providing For Environmental Safeguards In the Development Loans Given By the World Bank Group to Developing Countries*, 5 GA. J. INT'L & COMP. L. 540 (1975).

<sup>136</sup> Compare LOS Convention, *supra* note 38, art. 140, para. 1, with art. 160, para. (2)(f)(i).

<sup>137</sup> Charney, *supra* note 126, at 59.

<sup>138</sup> *Id.* at 61; see Oxman, *The Third United Nations Conference on the Law of the Sea*:

Council was similarly constituted or if it adopted a one-nation, one-vote system, the ISA would be balanced against the developed States.

As finalized in the LOS Convention, the Assembly "shall be considered the supreme organ of the Authority to which the other principal organs shall be accountable as specifically provided for in this Convention."<sup>139</sup> The Assembly has the power to establish general policies "on any question or matter within the competence of the Authority."<sup>140</sup> The Assembly also elects the members of the Council in accordance with Article 161.<sup>141</sup>

The Council would be the executive organ of the ISA, with the power to establish specific policies for the ISA in conformity with the LOS Convention and with the general policies established by the Assembly.<sup>142</sup> The Council would be composed of 36 members elected by the Assembly in the following order: (1) four members from among the countries that consume or import more than 2 percent of those types of minerals to be derived from the Area, with one of the countries being the largest consumer and one of the four being an Eastern European nation; (2) four members from among the eight nations with large seabed mining investments, with at least one country from Eastern Europe; (3) four members from the group of the major mineral exporting countries, with at least two being developing countries; (4) six members from among developing countries; and (5) eighteen members elected according to equitable principles of geographical distribution.<sup>143</sup>

All three of the ICNT texts perpetuated the "parallel system" of exploitation. The ICNT texts, however, differed on the right of States and private enterprises to mine the deep seabed. Under the parallel system, any company or consortium seeking to mine the seabed would be required to propose two equally exploitable sites to the ISA. The ISA would then permit the consortium to begin mining one site, retaining the other for exploitation by the Enterprise.<sup>144</sup> The ICNT/Rev.2, however, gave the ISA extensive

---

*The Tenth Session (1981)*, 76 AM. J. INT'L L. 1, 10 (1982) [hereinafter cited as *Tenth Session*] (some U.S. concern after Draft LOS Convention).

<sup>139</sup> LOS Convention, *supra* note 38, art. 160, para. 1.

<sup>140</sup> *Id.*

<sup>141</sup> *Id.* at art. 160, para. 2(a).

<sup>142</sup> *Id.* at art. 162.

<sup>143</sup> *Id.* at art. 161, para. 1.

<sup>144</sup> Pietrowski, *supra* note 45, at 64-65.

powers to regulate access to States and private consortia.<sup>145</sup> No similar restrictions were placed on the activities of the Enterprise. In addition, the ICNT/Rev.2 required transfer of mining technology to the Enterprise.<sup>146</sup> The Enterprise, therefore, had a substantial competitive advantage over other miners. Moreover, the ICNT/Rev.2 dispute settlement procedures did not provide for review of problems arising out of the parallel system.

The DC(IT), the Draft LOS Convention, and the LOS Convention retained the parallel system of exploitation. While seemingly appropriate, these texts were not amenable to renegotiation regarding those provisions which gave the ISA extensive powers to regulate or deny access.<sup>147</sup> In addition, these texts required the transfer of mining technology to the Enterprise, a concept which the industrialized countries found particularly offensive.<sup>148</sup>

The resource policy issue concerns regulation of the quantity of minerals mined from the deep seabed. The ICNT limited production of nickel from the seabed to the cumulative growth segment of the world nickel market for the first seven years of mining.<sup>149</sup> For the following twenty years, the limit was set at sixty percent of the cumulative growth segment.<sup>150</sup> These limits were modified in the subsequent negotiating texts.<sup>151</sup> Finally, the texts evolved to where the DC(IT), the Draft LOS Convention, and the LOS Convention utilized a different production limit formula. The LOS Convention, like the DC(IT) and the Draft LOS Convention, provided that an interim period should begin five years prior to January 1 of the year in which the earliest commercial production was to start. This period was to last twenty-five years, or until either the end of the Review Conference referred to in article 155 or new agreements entered force.<sup>152</sup> The Review Conference was scheduled to be held fifteen years from January 1 of the year of the earliest commercial production. The Review Conference was authorized to evaluate all aspects of the commercial production

---

<sup>145</sup> ICNT/Rev.2, *supra* note 120, art. 157.

<sup>146</sup> *Id.* at Annex III, art. 5.

<sup>147</sup> DC(IT), *supra* note 122, art. 157; Draft LOS Convention, *supra* note 123, art. 157; LOS Convention, *supra* note 35, art. 157.

<sup>148</sup> DC(IT), *supra* note 122, Annex III, art. 5, Draft LOS Convention, *supra* note 123, Annex III, art. 5; LOS Convention, *supra* note 38, Annex III, art. 5.

<sup>149</sup> ICNT, *supra* note 127, art. 150, para. 1(g)(B)(i).

<sup>150</sup> *Id.*

<sup>151</sup> See, e.g., ICNT/Rev.2, *supra* note 120, art. 151, para. 2.

<sup>152</sup> DC(IT), *supra* note 122, art. 151, para. 2(a); Draft LOS Convention, *supra* note 123, art. 151 para. 2(a); LOS Convention, *supra* note 38, art. 151, para. 3.

activities and to make any changes needed to ensure that the goals and principles of the LOS Convention were upheld.<sup>153</sup>

The production ceiling for any year of the interim period was designated as the sum of: (1) "the difference between the trend line values for nickel consumption . . . for the year immediately prior to the year of the earliest commercial production and the year immediately prior to the commencement of the interim period;"<sup>154</sup> and (2) "sixty percent of the difference between the trend line values for nickel consumption . . . for the year immediately prior to the year of the earliest commercial production."<sup>155</sup> The trend line was to be derived from a linear regression of the logarithms of the "actual nickel consumption for the most recent 15-year period . . . time being the independent variable."<sup>156</sup>

While the different ICNT texts ostensibly limited only nickel production, their restrictions effectively limited the production of all metals from manganese nodules.<sup>157</sup> Article 151, paragraph 2(f) of the DC(IT) and of the Draft LOS Convention, and article 151, paragraph 7 of the LOS Convention specifically limited the production of other metals derived from manganese nodules.<sup>158</sup> Similar to the later negotiating texts,<sup>159</sup> the ICNT texts also required compensation for loss of exporting country revenues caused by seabed mining.<sup>160</sup> The industrialized countries feared that these requirements restricted deep seabed mining to the point where private consortia would not proceed with exploration and exploitation.<sup>161</sup> Thus, under the LOS Convention, the U.S. goal of becoming self-sufficient in these minerals would not be achieved.

---

<sup>153</sup> DC(IT), *supra* note 122, art. 155; Draft LOS Convention, *supra* note 124, art. 155, LOS Convention, *supra* note 38, art. 155.

<sup>154</sup> LOS Convention, *supra* note 38, art. 151, para. 4(a)(i); see DC(IT), *supra* note 122, art. 151, para. 2(b)(i); Draft LOS Convention, *supra* note 123, art. 151, para. 2(b)(i).

<sup>155</sup> LOS Convention, *supra* note 38, art. 151, para. 4(a)(ii); see DC(IT), *supra* note 122, art. 151, para. 2(b)(ii); Draft LOS convention, *supra* note 123, art. 151, para. 2(b)(ii).

<sup>156</sup> DC(IT), *supra* note 122, art. 151, para. 2(b)(iii); Draft LOS Convention, *supra* note 123, art. 151, para. 2(b)(iii); LOS Convention, *supra* note 38, art. 151, para. 4(b)(i).

<sup>157</sup> See Charney, *supra* note 125, at 61.

<sup>158</sup> DC(IT), *supra* note 122, art. 151, para. 2(f); Draft LOS Convention, *supra* note 123, art. 151, para. 2(f); LOS Convention, *supra* note 38, art. 151, para. 7.

<sup>159</sup> ICNT, *supra* note 127, art. 150, para. 1(g)(D); ICNT/Rev.1, *supra* note 129, art. 151, para. 4; ICNT/Rev.2, *supra* note 120, art. 151, para. 4.

<sup>160</sup> DC(IT), *supra* note 122, art. 151, para. 4; Draft LOS Convention, *supra* note 123 art. 151, para. 4; LOS Convention, *supra* note 38, art. 151, para. 10.

<sup>161</sup> See Charney, *supra* note 126, at 61; *Tenth Session*, *supra* note 138, at 9-10.

*E. Policy Alternatives and Recommendations*

Failure to reach agreement on the seabed mining issue injured U.S. interests in several ways. First, the U.S. seabed mining industry lost much of its technological lead during the moratorium on seabed mining.<sup>162</sup> In addition, the delays in proceeding with deep seabed mining may have contributed to increased trade deficits. Finally, the U.S. goal of mineral self-sufficiency in important metals was delayed.<sup>163</sup>

Before the LOS Convention was finalized, four alternatives were available to the United States and to the other developed countries. The United States could have unilaterally abandoned the moratorium and initiated deep seabed mining. This alternative was partially implemented in the Seabed Resources Act of 1980.<sup>164</sup> Unilateral action, however, could have provoked a free-for-all among the seabed miners of different nations racing to be first to claim and exploit the deep seabed minerals.<sup>165</sup>

A second alternative, designed to avoid international conflict, involved deep-sea mining through the negotiation of a series of bilateral treaties. Since only a few countries possess the technology to mine the seabed, agreements between these countries were capable of being negotiated quickly. A similar bilateral approach has been successful in the area of fisheries, and the United States has negotiated many "Governing International Fishery Agreements" (GIFAs). This approach, while seemingly attractive, could have led to the collapse of UNCLOS III, jeopardizing other U.S. interests in the areas of navigation, living resources, environmental protection, and marine scientific research.<sup>166</sup>

Since the United States decided not to sign the LOS Convention as adopted, the bilateral treaty approach appeared to offer the best possibilities for U.S. success in the commencement of seabed mining activities. These bilateral treaties, while seriously considered by the United States,<sup>167</sup> were replaced by a multilateral "mini-treaty" with other industrialized countries. This multilateral treaty was the Agreement Concerning Interim Arrange-

---

<sup>162</sup> See Burton, *supra* note 36, at 1135-51.

<sup>163</sup> See Law, *supra* note 121, at 42.

<sup>164</sup> See *supra* text and note at note 32.

<sup>165</sup> See *Risky Venture*, *supra* note 45, at 359-60.

<sup>166</sup> See Charney, *supra* note 126, at 45-52.

<sup>167</sup> SIMMONDS, *supra* note 125, at xviii.

ments Related to Polymetallic Nodules of the Deep Seabed (Polymetallic Nodules Agreement).<sup>168</sup> The Polymetallic Nodules Agreement was secretly negotiated during 1982 once the vote of April 30, 1982 had finalized the LOS Convention and eliminated any possibilities for modification of the UNCLOS III regime. The framework of the Polymetallic Nodules Agreement provides the flexibility for the United States to enter into bilateral agreements concerning deep seabed mining. To provide environmental protection and to keep the miners of any one nation from gaining a competitive advantage, each bilateral agreement should establish and enforce environmental safeguards which are as broad in scope and as strict as the Seabed Resources Act.<sup>169</sup>

The third alternative would have been to accept the LOS Convention as it was finalized and begin mining under its provisions. The LOS Convention, however, is so heavily balanced in favor of the developing countries that the United States would not realize the benefits of deep seabed mining. Most importantly, the U.S. consortia would not profit from the investments already made in mining technology. Acceptance of the LOS Convention would have involved sacrificing the principle of maximizing aggregate material through "free market" operations. Many disciples of the market system theorized that the deep seabed provisions of the LOS Convention inadequately considered free market values and favored too heavily distributional values instead of the expansion of aggregate wealth.<sup>170</sup> There are other principles, beyond the protection of aggregate wealth, which the LOS Convention should promote.<sup>171</sup> These include the importance of international order and stability, both in terms of relations between nations and making seabed mining attractive to private investors.<sup>172</sup> Additionally, such concepts as human rights, the free pursuit of knowledge, and international communication are important factors.<sup>173</sup> The value of protecting the environment, a final consideration, can only be achieved by international standards that insure

---

<sup>168</sup> *Done*, Sept. 2, 1982 (entered into force Sept. 2, 1982).

<sup>169</sup> Note, *The Regulation of Seabed Mining Under the Reciprocating States Regime*, 30 AM. U.L. REV. 477, 514 (1980).

<sup>170</sup> Oxman, *Introduction: On Evaluation the Draft Convention on the Law of the Sea*, 19 SAN DIEGO L. REV. 456 (1982).

<sup>171</sup> *Id.* at 457.

<sup>172</sup> *Id.* at 458.

<sup>173</sup> *Id.* at 459-60.

both "fair competition" and the protection of the total marine environment.<sup>174</sup>

#### IV. THE LAW OF THE SEA PROVISIONS: PROTECTION OF THE MARINE ENVIRONMENT IN THE AREA

While the United States' rejection of the LOS Convention substantially weakened the value of the LOS Convention, a review of these provisions highlights the environmental concerns of the international community and the degree to which particulate pollution can be alleviated by maintaining a favorable international legal order. Article 136 of the ICNT/Rev.2 asserts that "[t]he Area and its resources are the common heritage of mankind."<sup>175</sup> The DC(IT) and the Draft LOS Convention contain this statement as well, and it was finalized in the text by the LOS Convention. If indeed this concept is valid, a *sine qua non* is the protection of the marine environment as the heritage of mankind.

Article 139 of the LOS Convention governs "[r]esponsibility to ensure compliance and liability for damage,"<sup>176</sup> and it appears that damages will result from a "breach of contract." However, the term "damages" is used in a broad manner and could conceivably include liability for harming the marine environment. As demonstrated above, the potential harm from particulate pollution and from processing ships is significant.

The marine pollution provisions governing the Area are subordinated to the regular marine pollution provisions in Part XII.<sup>177</sup> Article 142, paragraph 3, states that:

Neither this Part nor any rights granted or exercised pursuant thereto shall affect the right of coastal States to take such measures consistent with the relevant provisions of Part XII as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline, or related interests from pollution or threat thereof or from other hazardous occurrences resulting from or caused by any activities in the Area.<sup>178</sup>

This article appears to defer to the "specific" provisions of Part XII. Since particulate pollution will result from the activities of

<sup>174</sup> *Id.* at 459.

<sup>175</sup> ICNT/Rev.2, *supra* note 120, art. 136; *see* DC(IT), *supra* note 122, art. 136; Draft LOS Convention, *supra* note 38, art. 136.

<sup>176</sup> LOS Convention, *supra* note 38, art. 139.

<sup>177</sup> *See id.* at arts. 192-237.

<sup>178</sup> LOS Convention, *supra* note 36, art. 142, para. 3.

mining ships and since sludge will result from the processing ships, it is not unreasonable to assert that article 211, regulating "vessel-source pollution," should govern ships engaged in deep seabed mining.<sup>179</sup> This interpretation means that the International Maritime Organization (IMO) has a great deal of authority in regulating "vessel-source pollution."

The main provision governing protection of the marine environment, article 145, states that necessary measures shall be taken in accordance with the LOS Convention in order to protect the marine environment.<sup>180</sup> The terminology, "in accordance with this Convention," is positioned before language which grants some power to the Authority.<sup>181</sup> Accordingly, under article 145, the Authority may only regulate pollution in the Area in a manner consistent with the regular marine pollution provisions of the LOS Convention.

Under article 162, paragraph 2(w), the Council may "issue emergency orders, which may include orders for the suspension or adjustment of operations, to prevent serious harm to the marine environment arising out of activities in the Area. . . ."<sup>182</sup> This section is designed for emergencies and is subject to the specific rules of Part XII. For example, if the IMO issued an order under article 211 regulations<sup>183</sup> due to a massive vessel-source oil spill in the Area and the Council issued a conflicting order under article 162, paragraph 2(w), the IMO order should take precedence.

Article 162 also authorizes the establishment of "marine sanctuaries" or "wilderness areas" in the oceans under paragraph 2(x) which allows the Council to "disapprove areas for exploitation by contractors or the Enterprise in cases where substantial evidence indicates the risk of serious harm to the marine environment. . . ."<sup>184</sup> This paragraph inaugurates an important concept with regard to the marine environment, and marine sanctuaries should be encouraged.

These minor environmental responsibilities within the penumbra of the Council appear to have been delegated to the Legal and Technical Commission under article 165, specifically

---

<sup>179</sup> *Id.* at art. 211.

<sup>180</sup> *Id.* at art. 145.

<sup>181</sup> *Id.*

<sup>182</sup> *Id.* at art. 162, para. 2(w).

<sup>183</sup> *Id.* at art. 211.

<sup>184</sup> *Id.* at art. 162, para. 2(x).



paragraphs 2(f) and 2(g).<sup>185</sup> These provisions confirm the interpretation that the trend is to delegate marine pollution regulation to specific sections, and in particular, to Part XII. The main thrust of article 165 appears to be "monitoring"<sup>186</sup> the marine environment and making "recommendations."<sup>187</sup> Paragraph 2(d) supports this conclusion by requiring the functional equivalent of an "international environmental impact statement."<sup>188</sup> Thus, the marine pollution provisions in Part XI are general and more advisory in nature. Deference should, therefore, be given to the more specific pollution provisions in Part XII.

Within Part XII, article 209 governs "Pollution from activities in the Area,"<sup>189</sup> and article 215 involves "Enforcement with respect to pollution from activities in the Area."<sup>190</sup> Since articles 209 and 215 are not only general provisions, but also ambiguous ones, it could be argued that articles 208 and 214 governing "pollution from sea-bed activities" pre-empt the general provisions.<sup>191</sup> By a similar logic, the vessel-source pollution provisions are quite specific, and therefore, article 211 should govern marine pollution from deep seabed mining.<sup>192</sup> In light of this analysis, it would seem that articles 209 and 215 are inadequate<sup>193</sup> and should not be utilized except when regulation through more specific provisions becomes impossible.

## V. CONCLUSION

In 1982 the Reagan Administration rejected the LOS Convention which had evolved from the UNCLOS III negotiations. This action was prompted by the deep seabed mining portion of the LOS Convention which included what was considered inequitable provisions biased against the United States and other developed countries. However, the environmental provisions of the LOS Convention relating to deep seabed mining were generally acceptable to the United States. A type of "international environmental impact statement" was even included in the LOS Conven-

---

<sup>185</sup> *Id.* at art. 165, para. 2(f)-2(g).

<sup>186</sup> *See, e.g., id.* at art. 165, para. 2(h).

<sup>187</sup> *Id.* at art. 165, para. 2(e)-2(m).

<sup>188</sup> LOS Convention, *supra* note 38, art. 165, para. 2(d).

<sup>189</sup> *Id.* at art. 209.

<sup>190</sup> *Id.* at art. 215.

<sup>191</sup> *See id.* at arts. 208, 214.

<sup>192</sup> LOS Convention, *supra* note 35, art. 211.

<sup>193</sup> *Id.* at arts. 209, 215.

tion. The international acceptance of this concept and other environmental principles by UNCLOS III were important advances in international environmental law. Unfortunately, enforcement mechanisms needed to be strengthened to ensure *de facto* implementation of these principles and not just *de jure* acknowledgement of them.

The decade-long UNCLOS III negotiations yielded an unexpected benefit by providing the time necessary to conduct environmental studies of the impacts of deep seabed mining to exploit manganese nodules. It is possible to extrapolate from these studies and to apply their environmental principles to other types of ocean mining such as mining for phosphorite nodules or dredging for minerals in coastal areas. The environmental impacts of different types of seabed mining can be collectively referred to as "particulate pollution," which is perhaps the largest and most noticeable environmental impact affecting the marine ecosystem.

The United States and other countries need to continue their efforts to control particulate pollution from all types of seabed mining. In the absence of an acceptable UNCLOS III treaty, the United States will be faced with maintaining the environmental integrity of sites selected for deep seabed mining. While changing the LOS Convention in the immediate future is unlikely, the renegotiation of some of the provisions of the LOS Convention under its amendment provisions is a possible scenario for the future.

Accordingly, the United States and its allies should build a record of possible changes which would make the LOS Convention acceptable. The changes can be divided into two categories: (1) minor changes, such as those which would strengthen the enforcement mechanisms for environmental protection of deep seabed mining areas, and (2) substantive changes, such as the renegotiation of the transfer of technology provisions. The minor changes should be introduced and considered as being completely separate from the other changes. Hopefully, this approach will militate against an influx of historically volatile issues into the discussions involving minor changes. The goal is to renegotiate the provisions of the LOS Convention and reestablish the common interests in an equitable treaty regime. Once this is achieved, both developed and developing countries can address the more controversial, philosophical differences in the deep seabed mining provisions. This latter suggestion may appear to be impractical, but history has often demonstrated that negotiating positions can

change and that new conditioning factors can reveal negotiating flexibility where there was none before.

International negotiators should remember that the development of ocean resources necessarily requires environmental protection. The environmental costs of developing ocean resources should be "internalized," whereby the developers bear the costs of environmental protection as part of the cost of development. While this principle would reduce profits, it would place the burden of environmental protection in its appropriate place—on the developer. In addition, the glow of "huge profits," which impassioned the UNCLOS III negotiations, would fade into "reasonable profits" or perhaps even "minimal profits." This reduction in the ocean "ante" should provide a corresponding reduction in the vehement rhetoric which encompasses deep seabed mining. The future may eventually reveal that deep seabed mining can be conducted within an equitable framework which protects the ocean environment for future generations by internalizing the costs of environmental protection.

**APPENDIX I**  
CUMULATIVE WORLD DEMAND FOR NODULE METALS AND  
THE DEEP SEABED CONTRIBUTION

Metal	Total World Demand to 2010 AD ( $\times 10^8$ short-tons)	Deep Seabed Mining Cumulative Production to 2010 AD ( $\times 10^8$ short-tons)	Deep Seabed Production as a Percent of Total World Demand
Nickel	31,000	11,300	36
Copper	530,000	9,400	1.8
Cobalt	1,400	1,400	100
Manganese	600,000	150,000	25

Source: NAT'L OCEANIC & ATMOSPHERIC AD., U.S. DEPT. COM., 1 DEEP SEABED MINING: FINAL PROGRAMMATIC ENVTL. IMPACT STATEMENT 279 (1981).

**APPENDIX II**  
**DEEP SEABED MINING CONSORTIA INVOLVING U.S. FIRMS**  
**(INCLUDING DATES OF CONSORTIA FORMATION)**

Nation	Kennecott Corp. (1/74)	Ocean Mining Associates (OMA) (11/74)	Ocean Management Inc. (OMI) (5/75)	Ocean Minerals Company (OMCO) (11/74)
United States	Kennecott Corp. Noranda Exploration, Inc.	Deepsea Ventures, Inc. (Tenneco and *) *Essex Minerals Co. (U.S. Steel) *Sun Ocean Ventures, Inc. (Sun Oil)	Sedco, Inc.	Ocean Minerals, Inc. (Lockheed Missiles & Space Co.; Billiton**; BRW***) Amoco Ocean Minerals Co., (Standard Oil Co. of Indiana) Lockheed Systems Co., Inc. (Lockheed Corp.)
Belgium		*Union Seas, Inc. (Union Miniere)		
Canada			INCO, Ltd.	
Italy		*Samin Ocean Inc. (Subsidiary of Italian Govt.)		
Japan	Mitsubishi Corp.		Deep Ocean Mining Co., Ltd.	
Netherlands				**Billiton B.V. (Royal Dutch Shell) ***BRW Ocean Minerals (Royal Bas Kalis Westminister Group N.V.)

1985]

LAW OF THE SEA

307

APPENDIX II (Continued)

Nation	Kennecott Corp. (1/74)	Ocean Mining Associates (OMA) (11/74)	Ocean Management Inc. (OMI) (5/75)	Ocean Minerals Company (OMCO) (11/74)
United Kingdom	R.T.Z. Deep Sea Mining Enterprises, Ltd. Consolidated Gold Fields, Ltd. BP Petroleum Dev., Ltd.			
West Germany			AMR	

Source: NAT'L OCEANIC & ATMOSPHERIC AD., U.S. DEP'T COM., DEEP SEABED MINING: FINAL PROGRAMMATIC ENVTL. IMPACT STATEMENT 32 (1981).

**APPENDIX III**  
**SUMMARY OF INITIAL ENVIRONMENTAL CONCERNS AND POTENTIAL SIGNIFICANCE:**  
**IMPACTS OF DEEP SEABED MINING**

Initial Conditions <sup>1</sup> Disturbance	Physio-Chemical Effects	Potential Biological Impacts (Remaining Concerns in Capitals)	Potential Significance of Biological Impact			
			Probability of Occurrence	Recovery Rate	Consequence	Overall Significance
Collector	°Scour and compact sediments	DESTROY BENTHIC FAUNA IN AND NEAR COLLECTOR TRACK	Certain	Unknown <sup>3</sup> (Probably Slow)	Adverse	Unavoidable <sup>5</sup> (Uncertain Sig)
	°Light and Sound	Attraction to new food supply; possible temporary blindness	Unlikely	Unknown (Probably Rapid)	Uncertain	None
Benthic Plume	°Increased sedimenta- tion rate and in- creased suspended matter ("rain of fines")	°EFFECT ON BENTHOS — Covering of food supply	Likely	Unknown <sup>3</sup> (Probably Slow)	Adverse	Unknown <sup>5</sup>
		— Clogging of respiratory surface of filter feeders	Likely	Unknown <sup>3</sup> (Probably Slow)	Adverse	Unknown <sup>5</sup>
		— Blanketing	Certain	Unknown <sup>3</sup> (Probably Slow)	Adverse	Unknown <sup>5</sup>
		°Increased food supply for benthos	Unlikely	Rapid <sup>4</sup>	Possibly Beneficial	None
	°Nutrient/Trace Metal increase	°Trace metals uptake by zooplankton	Unlikely	Rapid	No detectable effect	None
	°Oxygen demand	°Lower dissolved oxygen for organisms to utilize; mortality from anaerobic conditions	Unlikely	Rapid	No detectable effect	None

1985]

LAW OF THE SEA

309

# APPENDIX III (Continued)

Initial Conditions <sup>1</sup> Disturbance	Physio-Chemical Effects	Potential Biological Impacts (Remaining Concerns in Capitals)	Potential Significance of Biological Impact			
			Probability of Occurrence	Recovery Rate	Consequence	Overall Significance
Surface Discharge Particulates	°Increased suspended particulate matter (sediments, nodule fragments and biota debris)	°Effect on Zooplankton — Mortality	Unlikely	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
		— Change in abundance and/ or species composition	Unlikely	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
		— Trace metal uptake	Unlikely	Rapid <sup>4</sup>	Locally Adverse	Low <sup>5</sup>
		— Increase food supply due to introduction of benthic biotic debris and elevated microbial activity due to increased substrate	Unlikely	Rapid <sup>4</sup>	Possibly Beneficial	None
		°Effect on adult fish	Unlikely	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
		°EFFECT ON FISH LARVAE	Uncertain (Low)	Uncertain (Probably Rapid)	Uncertain	Low <sup>5</sup>
	°Oxygen Demand	°Lower dissolved oxygen for organisms to utilize	Unlikely	Rapid	No detectable effect <sup>2</sup>	None
	°Pynocline accumulation	°Effect on primary productivity	Unlikely	Uncertain (Probably Rapid)	Unknown (Prob. Undetect)	Low
	°Decreased light due to increased turbidity	°Decrease in primary productivity	Certain	Rapid <sup>4</sup>	Locally Adverse	Low

## APPENDIX III (Continued)

Initial Conditions <sup>1</sup> Disturbance	Physio-Chemical Effects	Potential Biological Impacts (Remaining Concerns in Capitals)	Potential Significance of Biological Impact			
			Probability of Occurrence	Recovery Rate	Consequence	Overall Significance
Surface Discharge Dissolved Substances	°Increased nutrients	°Increase in primary productivity	Very low	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
		°Change in phytoplankton species composition or intro- duce deep-sea microbe or spores to surface	Very low	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
	°Increase in dissolved trace metals	°Inhibition of primary productivity	Very low	Rapid <sup>4</sup>	No detectable effect <sup>2</sup>	None
	°Supersaturation in dissolved gas content	°Embolism	Very low	Rapid	No detectable effect <sup>2</sup>	None

1. Include characteristics of the discharge and the mining system.

2. Based on experiments/measurements conducted under DOMES.

3. Years to tens of years, or longer.

4. Days to weeks.

5. Areas of future research.

Uncertain = Some knowledge exists; however the validity of extrapolations is tenuous.

Unknown = Very little or no knowledge exists on the subjects; predictions mostly based on conjecture.

SPM = Suspended Particulate Matter

Source: NAT'L OCEANIC & ATMOSPHERIC AD., U.S. DEP'T COM., DEEP SEABED MINING: MARINE ENVTL. RESEARCH PLAN 1981-1985 4 (1982).